UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

March 10, 2002

R.F. Krochalis
Regional Administrator
U.S. Department of Transportation
Federal Transit Administration, Region 10
Federal Building., Suite 2410
915 Second Avenue
Seattle, Washington 98174-1002

Re: Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Sounder Everett-to-Seattle Commuter Rail Project (WSB-00-107)

Dear Mr. Krochalis:

The attached document contains the NOAA's National Marine Fisheries Service's (NOAA Fisheries) Biological Opinion (Opinion) on the proposed Sounder Everett-to-Seattle Commuter Rail Project in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531 *et seq*.). This document also includes the consultation on Essential Fish Habitat pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations (50 CFR Part 600).

The Federal Transit Administration (FTA) had determined, under the ESA, that the proposed action is likely to adversely affect the Puget Sound chinook salmon (*Oncorhynchus tshawytscha*) Evolutionarily Significant Unit (ESU). It similarly concluded that EFH would be adversely affected by the proposed action. Formal ESA consultation, and EFH consultation were both initiated on January 30, 2003.

The Opinion and the EFH consultation are based on information provided by the FTA in the Biological Assessment received by NOAA Fisheries on January 21, 2003 and additional information transmitted via telephone conversations, meetings, mail, and e-mail with the FTA and FTA's grantee, Sound Transit. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

NOAA Fisheries concluded that the proposed action is not likely to jeopardize the continued existence of Puget Sound chinook salmon. As required by Section 7 of the ESA, NOAA Fisheries has included reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the potential for incidental take associated with this action. NOAA Fisheries concluded that EFH may be adversely affected, and has provided Conservation Recommendations for EFH in this document.

If you have any questions regarding this consultation, please contact Thomas Sibley of the Washington State Habitat Branch Office at (206) 526-4446.

Sincerely,

for Michael R Course

D. Robert Lohn
Regional Administrator

cc: Jennifer Bowman, FTA
Chris Townsend, Sound Transit

Endangered Species Act - Section 7 Consultation
BIOLOGICAL OPINION
And
Magnuson-Stevens Fishery Conservation and Management Act
ESSENTIAL FISH HABITAT CONSULTATION

Everett-Seattle Commuter Rail Project
King and Snohomish Counties, Washington
NOAA Fisheries Project No. WSB-00-107

Agency: Federal Transit Administration

Consultation Conducted by: National Marine Fisheries Service ,
Northwest Region

Approved by: For Michael R Course Date: March 10, 2003

D. Robert Lohn
Regional Administrator

TABLE OF CONTENTS

1.0 INTRODUCTION

This Biological Opinion (Opinion) and Essential Fish Habitat (EFH) consultation is based on the NOAA's National Marine Fisheries Service's (NOAA Fisheries) review of a proposal by the Federal Transit Administration (FTA) to fund an Everett-to-Seattle Commuter Rail Project in King and Snohomish Counties, Washington. The project consists of developing and/or modifying six commuter rail stations and improving sections of the rail corridor along 35 miles of the existing Burlington Northern Santa Fe (BNSF) rail right-of-way (ROW) adjacent to Puget Sound. The rail corridor improvements (CIs) include signal upgrades, installation/reconfiguration of sections of track, new universal crossovers, and station and parking lot improvements. The project area is within the Puget Sound chinook salmon (*Oncorhynchus tshawytscha*) Evolutionarily Significant Unit (ESU). Puget Sound chinook salmon were listed as threatened under the Endangered Species Act (ESA) on March 24, 1999 (50 CFR 223 and 224). Puget Sound is also EFH for various life stages of 46 species of groundfish, four species of coastal pelagics, and three species of Pacific salmon (see Section 3).

1.1 Background Information

Vehicle congestion in the Puget Sound region has increased to the point of becoming some of the worst in the United States. As a result, a regional transportation plan (*Sound Move*) was proposed and approved by the voters in 1996. This regional plan included light rail, additional bus routes, and commuter rail via existing BNSF ROW. The commuter rail portion of the regional plan was envisioned to provide service from Everett in the north to Lakewood in the south, servicing both Seattle and Tacoma. This document pertains only to the northern segment from Everett to Seattle. Two other segments of the commuter rail line have been consulted on separately through the informal ESA Section 7 and EFH consultation process. The FTA partial funding for the northern segment is from the Federal New Starts Program which is authorized by the FTA TEA-21 program.

The existing freight rail line between Everett and Seattle is built, for most of its distance, on fill that was placed in the upper intertidal area along the eastern shore of Puget Sound. Most of the rail line is double tracked so that two trains can operate both north and south bound at the same time. However, there are three places where only single tracks exist. To be able to meet a schedule necessary for commuter service, the FTA, through its grantee, the Central Puget Sound Regional Transit Authority (Sound Transit), is proposing to expand the single track segments to double track. To add the new track segments, the railroad bed must be widened in three areas, which will result in additional fill in the intertidal beach along the BNSF ROW. The FTA concluded that the project proposed by Sound Transit is likely to adversely affect Puget Sound chinook salmon through the placement of additional fill in the intertidal area of Puget Sound. In addition to the fill in Puget Sound, freshwater wetlands will be filled and culverts will be lengthened to accommodate the increased width of the railroad bed and other proposed improvements to the rail line that are necessary to allow for safe commuter rail operation, in what has historically been a freight rail corridor.

1.2 Consultation History

The document is based on information provided in the Biological Assessment (BA), EFH Assessment, and the following written correspondence:

1. On February 20, 2002, NOAA Fisheries received a letter of transmittal for the BA and EFH Assessment from FTA. Also on that date, representatives from the following entities met to discuss rehabilitation/restoration activities associated with the proposed action: NOAA Fisheries, the U.S. Fish and Wildlife (USFWS), the Washington Department of Fish and Wildlife (WDFW), the Washington State Department of Ecology (WDOE), the Tulalip and Suquamish Tribes, the U.S. Environmental Protection Agency, FTA, and Sound Transit and its environmental consultants (note: the BA and EFH assessment lacked a finalized restoration/rehabilitation plan to offset the loss of chinook salmon habitat due to filling aquatic areas).

2. On May 29, 2002, Sound Transit provided a tour of the rail line between Seattle and the Everett terminus of the proposed commuter rail corridor.

3. On June 26, 2002, NOAA Fisheries and USFWS met with Sound Transit, FTA, and their consultants to discuss the mitigation plan.

4. On July 10, 2002, NOAA Fisheries completed a review of the mitigation plan, the EFH Assessment, and the BA.

5. On July 15, 2002, NOAA Fisheries, USFWS, and the U.S. Army Corps of Engineers met with the technical team from Sound Transit to discuss several technical issues related to the BA, EFH assessment, and the beach rehabilitation plan.

6. On January 21, 2003, NOAA Fisheries received the final BA, EFH Assessment, and Mitigation Plan (dated January 9, 2003) from the FTA.

7. On January 29, 2003, NOAA Fisheries received an *errata* sheet to the BA, EFH Assessment, and Mitigation Plan. The errata sheet also contains additional information about installation of the mitigation actions.

8. On January 29, 2003, NOAA Fisheries sent a letter to FTA giving notification of official starting date for the writing of the Opinion and EFH consultation.

Additionally, numerous telephone conversations and e-mail correspondence between NOAA Fisheries' staff, Sound Transit, USFWS, and FTA are included in the administrative record.

1.3 Description of the Proposed Action

The proposed action involves funding the development and/or modifications to six commuter rail stations along the Everett-to-Seattle corridor, 24 CIs to facilitate commuter rail service along the active freight corridor, and improvement of nine at-grade road crossings. The CIs are numbered starting in Everett based on location along the tracks (*i.e.,* CI 1 occurs at Lowell Junction in

Everett at the north end of the project and CI 24 occurs in Seattle at the south end of the project-see Figure 3 of the BA). For the purpose of discussion, the CIs are grouped together by similar activities. The proposed action also includes freshwater and marine habitat restoration and monitoring, and Conservation Measures (CMs) for construction and operation activities.

1.3.1 Train Stations

Sound Transit proposes to construct a new commuter rail station in Mukilteo, with provisional stations in Shoreline, Ballard, and Seattle. It also proposes a commuter rail park-and-ride lot at the Everett Multimodal Station, and modifications to the existing rail station in Edmonds. The stations are in urban areas and will require minor improvements and construction to provide commuter rail service to largely developed areas. Some of the improvements are common to all the stations and include providing platform amenities such as passenger shelters, improving sidewalks, access drives, signage, repaving, sealing, and striping. None of the proposed station work will alter freshwater streams, saltwater habitat, or wetlands. Sound Transit has incorporated CM such as best management practices (BMPs) for stormwater detention and treatment, erosion and sediment control, hazardous spill prevention, construction methods, staging, and timing into the construction plans and operational procedures of the stations.

A. **Everett Station.** As part of the Everett Multimodal Station located at the intersection of Pacific and Smith Avenues in downtown Everett, Sound Transit will construct a joint-use 710-foot long platform for Amtrak service next to the existing BNSF main line tracks and also construct a 600-foot long platform for commuter rail service that may be extended to 1,000 feet in the future. Sound Transit will locate the commuter rail platform adjacent to new tracks to be constructed as part of the CIs. A pedestrian bridge will span the tracks connecting the parking area to the commuter rail station. A 1,500 square foot operations building will be located next to the pedestrian bridge. Sound Transit will construct approximately 500 parking spaces in a surface lot east of the tracks, along with stormwater collection, detention, and treatment systems.

B. **Mukilteo Station.** Sound Transit will construct a new commuter rail station approximately 1,000 feet north of the Mukilteo Speedway (State Route 525), near the existing Whidbey Island ferry dock. The station siting requires relocating both mainline tracks for approximately 0.7 miles. A 600-foot long platform will be constructed on each side of the BNSF tracks, with the potential for future expansion to 1,000 feet. The station will become an integral part of the Mukilteo Multimodal Terminal. The existing tank farm in Mukulteo will serve as temporary parking (two to four years). The tank farm consists of entirely impervious surface. Plans include striping and landscaping, removing portions of the existing perimeter walls, and minor paving and resurfacing. Land disturbing activities are not proposed. Parking for as many as 120 vehicles will be located on or near the Multimodal Terminal and a pedestrian bridge will span the tracks.

C. **Edmonds Station.** The existing Amtrak station between Dayton Avenue and Main Street will be the site for the commuter rail station. The facility will include approximately 120 parking spaces on existing surface lots near the station. The station will have a 1,000-foot-long platform on each side of the tracks. The double-track installation in this location will require narrowing Railroad Avenue, which is located within BNSF ROW.

D. **Shoreline Station.** Sound Transit anticipates locating this provisional rail station south of Point Wells, and including 120 new parking spaces and a 600-foot long platform on each side of the tracks with the potential to extend the platforms to 1,000 feet. A provisional station is one that is planned but not currently funded. It may or may not be built at some point in the future, depending on the availability of funds.

E. **Ballard Station.** Sound Transit has no preferred station location alternative at this time. Two location alternatives exist between NW 62nd and 67th Streets, and NW 68th and 71st Streets, respectively. Parking for either would be provided at existing parking lots. Either station location would include a 600-foot long platform on each side of the mainline tracks with the potential to extend the platforms to 1,000 feet.

F. Seattle Station. The provisional Seattle Broad Street Station would be served by bus and pedestrian access to and from the north downtown area. The commuter rail station would include surface sidewalks and a plaza area with 600-foot long platforms on each side of the mainline tracks, with the potential to extend the platforms to 1,000 feet. Sound Transit plans no new parking for this station. The station is not currently there now. The planned location is primarily impervious surface and gravel ballast along with mainline tracks and an old siding. The station would be built entirely within railroad right of way.

1.3.2 Corridor Improvements (CIs)

The locations of the CIs are shown in Figure 3 of the BA and are described in detail below. The following are the four basic categories of CIs (note: there is no CI number 14):

- Re-build/re-configure/upgrade existing sections of track and/or build new tracks (CIs 1-5, 11, 12, 16, 20, 23, and 24)
- Construct five universal crossovers/track signals (CIs 13, 15, 18, 21, and 22)
- Improve Centralized Traffic Controls (CTC) (CIs 6-10)
- Improve at-grade road crossings at nine intersections (not numbered)

A. **Re-build/re-configure/upgrade sections of track and/or build new tracks (CIs 1-5, 11, 12, 16, 20, 23, and 24)**

- **Everett - Lowell Junction to Sealine Junction - Third Mainline Track (CI 1).**
- Sound Transit will construct a third mainline track within an existing BNSF ROW to provide exclusive access for freight trains. This work requires 1.25 acres of freshwater

wetland to be filled and existing culverts to be extended.

- **Everett - Lowell Junction to Pacific Avenue Junction - Second Mainline Track (CI 2).** Sound Transit will improve an existing storage track to serve as a second mainline track.

- **Everett - Pacific Avenue Junction/Delta Yard Junction - Industrial Track (CI 3).** Sound Transit will relocate the existing industrial single-track from the Pacific Avenue Junction to the Delta Junction yard, to serve industrial users and accommodate the Everett Station.

- **Everett Station - Overnight Storage Tracks (CI 4).** Sound Transit will construct a new overnight storage track at the Everett Multimodal Station along Smith Avenue, one block south of Pacific Avenue. The storage track will extend 2,900 feet south of the Everett Station, parallel to the existing mainline. The track will be used to store commuter trains overnight before traveling to and from the Everett station to begin and end customer service each day. The improvements consist of constructing storage track, installing fencing, yard lighting, drip-oil pans, and electrical connections. Freshwater wetland fill associated with this CI totals 0.05 acres.

- **Everett - Sealine Junction to Rogers Siding - Second Mainline Track (CI 5).** Sound Transit will extend a second track to the south end of Rogers Siding at Mile Post (MP) 9.75. Minor grading work, filling 0.62 acres of freshwater wetland, and culvert lengthening are planned.

- **Everett - Bayside Line - Upgrade Existing Track (CI 11)**. Sound Transit will upgrade the existing track to allow for freight capacity through the Everett train tunnel and to accommodate commuter rail service. The existing track will be upgraded for through freight service. New rails and ties will be replaced as necessary. Track curves will be slightly modified to increase operating speeds to 50 miles per hour where track curvature permits. This modification will consist of adding ballast to elevate one rail to increase super-elevation to allow the train to tilt slightly at higher speeds. All work will be within the existing trackbed, and no additional tracks will be constructed.

- **Everett Junction - Convert Everett Set-out Track to Mainline Track (CI 12**). Sound Transit will convert the existing set-out track at Everett Junction to serve as a mainline track along the existing alignment. It requires no grading or major construction work.

- **Mukilteo - Double Track (CI 16).** Sound Transit's modifications for CI 16 Mukilteo and CI 20 Edmonds/Woodway (described below) will alter 2.7 acres of nearshore marine habitat by adding 0.6 acres of new riprap over existing riprap, converting 1.1 acres of existing aquatic riprap habitat to upland by placing fill, converting 1.0 acre of natural substrate to aquatic riprap, and temporarily altering 1.15 acres of natural substrate at the toe of the riprap. Where fill is to be placed, Sound Transit will replace the existing vertical seawall with a 2-to-1 sloped wall below the mean higher high water line (MHHW). The 2.7 acres of fill will cover a linear distance of approximately 6,200 feet. Of the 6,200 linear feet, approximately 1,000 linear feet of the fill will be on the east side

of the tracks in intertidal lagoons. The lagoons are intertidal areas east of the tracks, inadvertently created by the placement of the historic railroad fill. Culverts under the tracks allow the tides to move water in and out of these areas. Chinook salmon do not appear to utilize the lagoons (see Section 2.1.2.B for more description of the lagoons).

Sound Transit will construct approximately one mile of new second mainline to supplement the existing single main line between MP 27.0 and MP 28.0. More specifically, between MP 27.1 and MP 27.5, a wide, flat parcel of land occurs adjacent to the east side of the existing track. In this segment, Sound Transit will construct the second track in uplands and no in-water construction or fill in Puget Sound will be necessary. Sound Transit will shift the existing track in some areas to make room for the proposed second track. In contrast, at the northern and southern end of this track segment, the existing track is bordered on the east by a steep bluff, and on the west by the rock seawall that supports the railroad fill. In these areas, the railroad bed of the second track will extend into Puget Sound and will be supported by armored fill for approximately 3,400 linear feet. Below Extreme High Water (EHW), the fill requires armoring with three to five-ton quarry stone placed on a 2-to-1 slope to protect the fill against wave action. The armoring will also need a 10-foot wide toe (along the length of the new fill) embedded into the beach to provide a foundation and prevent scouring of the armoring rock. The toe will be over-excavated and backfilled with up to 18 inches of beach material to restore natural substrate and habitat conditions. Above EHW, the fill will be contained by a concrete block retaining wall. The retaining wall will be located 15 feet west of the centerline of the track.

Sound Transit will lengthen two culverts by 15 to 25 feet to accommodate the increase width of the railroad bed fill. Both culverts exist under the railroad bed and convey unnamed streams. One will be lengthened on the downstream (marine) side; the other on the upstream side.

- **Edmonds/Woodway - Double Track (CI 20).** The total amount of intertidal fill associated with CI 16 and CI 20 is described under CI 16 above. Sound Transit will construct a second mainline track to supplement the existing single main line track from approximately MP 15.9 to MP 17.8 (1.9 miles). The existing track is bordered by a steep bluff on the east and rock seawall on the west. There are also two large intertidal lagoons on the east side of the track at the base of the bluff, connected to Puget Sound by culverts. In this track section, the double-track work will be primarily on the east side of the existing tracks. In the lagoon areas, armored fill with a concrete block retaining wall above EHW will support the new track. The lagoon areas will require only light armoring (such as riprap), and Sound Transit will lengthen existing culverts by 15 to 25 feet on the east side of the tracks. The new railroad bed will extend into the lagoons for a distance of approximately 1,000 linear feet.

  North of the lagoon areas, approximately 1,800 linear feet of the new railroad bed will extend into Puget Sound. Armored fill with a concrete block retaining wall above EHW will support the new track in this area. The retaining wall will be 15 feet from the centerline of the new track. Below EHW, the fill in Puget Sound requires armoring with one-half to one-ton quarry stone placed on a 2-to-1 slope to resist wave action. The

armoring in Puget Sound will also require a 10-foot wide toe, parallel to the rail line, embedded into the beach along the length of the new fill to provide a foundation and prevent scouring of the toe. The toe may be over-excavated and backfilled with up to 18 inches of beach material to restore natural habitat conditions. Sound Transit will alter 15 to 25 feet of freshwater habitat by lengthening the culvert at Deer Creek.

A temporary haul road may be necessary in Edmonds to transport fill material for the double-track work for CI 20. Sound Transit would construct this road east of the existing tracks, and transport fill materials for the double-track section between Edmonds and Woodway via tire or track mounted equipment working from upland areas on the east side of the tracks. The majority of fill transport will occur over a four to six week period.

- **Ballard - Double Track (CI 23).** Sound Transit will add approximately 0.5 miles of mainline track opposite Shilshole Marina between MP 7.3 and MP 7.8. It will locate the track on the east side of the existing single mainline track, where a second track previously existed. It will replace the existing 33-foot long single track bridge with a 60-foot long concrete box culvert (eight feet wide by three feet tall) under both tracks, and fill 0.22 acres of freshwater wetland. Retaining walls will be placed east of the newly installed second track, in front of and adjacent to an existing wall that is deteriorating.

- **Seattle - Interbay Rail Yard - Double Track (CI 24).** In the Interbay Rail Yard between MP 3.28 and MP 5.49, adjacent to the many existing tracks, Sound Transit will install approximately 2.2 miles of new second mainline track. This improvement includes reconstruction of the yard track to the second mainline (1.61 miles) and shifting two additional tracks between MP 1.67 and 3.28, and installation of universal crossovers at MP 3.0 and 5.49. Sound Transit will install a retaining wall east of the existing access road between MP 4.0 and MP 4.2. Retaining walls will also be installed on both sides of the tracks at the north end of Interbay Yard, between MP 5.0 and MP 5.5. All work will be conducted within the BNSF ROW.

B. **Universal Crossovers (CIs 13, 15, 18, 21 and 22).** A universal crossover consists of four switches and connecting sections of track that allow a train to switch from one track to the other. The length of the crossover track section is approximately 1,500 to 2,000 feet. The signals (two at each end of the crossover) are placed on 20-foot high signal masts, approximately 10 feet from the edge of the railroad tie. The switches are contained within prefabricated steel storage units (utility bungalows). Except for the signals and utility bungalows, all work associated with the universal crossover will occur within the existing BNSF ROW. Sound Transit plans to construct universal crossovers at key locations in the project corridor to improve safety and reduce train delays as follows:

- **Howarth Park - Universal Crossover (CI 13).** A new universal crossover near Howarth Park within the 2,000-foot long track segment between MP 31.3 and MP 31.7.

- **Mukilteo - Universal Crossover (CI 15).** A new universal crossover within the 2,000-foot long track segment between MP 28.5 and MP 29.0, north of the proposed Mukilteo station.

- **Picnic Point - Universal Crossover (CI 18).** A new universal crossover just south of Browns Bay between MP 23.5 and 23.9.

- **Richmond Beach - Universal Crossover (CI 21).** A new universal crossover within the 1,500-foot long track segment between MP 14.0 and MP 14.4, just south of Point Wells.

- **Metum - Universal Crossover (CI 22).** A new universal crossover within the 3,000-foot-long track segment between MP 8.7 and MP 9.3, just north of Golden Gardens Park.

C. **Centralized Traffic Control (CTC) - Everett (CIs 6 - 10).** Sound Transit will install five Centralized Traffic Control (CTC) signal systems in Everett at Everett Junction (CI 6), Delta Junction (CI 7), Sealine Junction (CI 8), Lowell Junction (CI 9), and possibly Pacific Avenue Junction (CI 10), to allow bi-directional train traffic and automatic switch operation. The signal systems also involve installing prefabricated metal buildings (15 feet long by 15 feet wide) on concrete footings for each signal, and underground wiring to the rails and signal masts, and/or signal bridges. Similar structures already exist at Everett, Lowell, and Pacific Avenue Junctions.

D. **Improve At-grade Crossing at Nine Intersections**. Sound Transit will perform minor work at nine at-grade crossings. The work may require minor grading and installation of track signals, signal utility bungalows, and CTCs. The location of the at-grade crossings are as follows:

- Everett 36th Street
- Mukilteo 1st Street
- Edmonds Dayton Street
- Edmonds Main Street (State Route 104)
- Seattle Galer Street
- Seattle Broad Street
- Seattle Clay Street
- Seattle Vine Street
- Seattle Wall Street

1.3.3 Freshwater and Estuary Habitat Restoration

As part of the proposed action, Sound Transit will place: a total of 1.0 acres of marine/intertidal fill on natural beach substrate from CIs 16 and 20; a total of 2.14 acres of freshwater wetland fill association with CIs 1, 4, 5, and 23. Sound Transit also will lengthen multiple culverts. To offset the ecological effects of the marine and freshwater alterations, Sound Transit will conduct the following habitat restoration as part of the proposed project (presented in detail in the Mitigation Plan dated January 9, 2003):

- **Re-armoring of the Existing Rock Seawall.** Approximately 15,300 linear feet of existing rock seawall between Woodway and Everett will be re-armored to prevent sloughing onto the beach. The footprint of the original seawall will not change. Areas where the wall has been historically reinforced with sidecast material (boulders and riprap) will be restored to the original footprint by re-armoring the wall and removing the sidecast material from the intertidal area.

- **Reduction in the Slope of the Rock Seawall.** Of the 15,300 linear feet of seawall that will be re-armored as described above, 10,500 linear feet between Woodway and Everett will be converted from the existing near-vertical rock seawall to a 2-to-1 slope using riprap, concrete blocks, and smaller rock material to fill the interstices.

- **Restoration of Estuary Habitat.** Sound Transit will implement an estuary habitat restoration project to restore habitat function near the mouth of the Snohomish River as described in the Mitigation Plan.

- **Nearshore Marine Habitat Enhancement.** Three alternative actions have been identified in the Mitigation Plan; one of which will be pursued by Sound Transit. The options include, (1) replacing one to two culverts along the BNSF ROW with trestles to allow greater amounts of sediment and organic matter to pass under the tracks and feed the intertidal beach areas; (2) acquiring and retiring log raft leases on the intertidal mudflats at the mouth of the Snohomish River; or (3) removing abandoned creosote treated pilings from the nearshore areas along the BNSF corridor between Seattle and Everett. The projects are listed in the order in which they will be pursued.

- **Freshwater Wetlands Restoration and Culvert Improvement.** A 3.2-acre area on the Snohomish River floodplain adjacent to existing wetlands and drainage channels will be restored to emergent, shrub, and forested wetland. The restoration site is located in Everett, near Lowell Junction. An existing ditch that flows through the restoration area will be enhanced to create off-channel habitat for fish. The culvert will be improved between the ditch and Bigelow Creek to improve fish passage and fish access to the wetland and off-channel habitat.

- **Deer Creek Pool Enlargement and Riparian Planting.** The existing stream pool in Deer Creek that occurs just east of the railroad bed will be enlarged upstream of the culvert. Deer Creek occurs at the CI 20 location. The larger pool size will increase the area available to fish for rearing. Sound Transit will plant riparian vegetation along the lower reach of the stream to provide shade and organic matter to the stream.

1.3.4 Conservation Measures

Sound Transit and its contractors will comply with erosion and sediment control criteria outlined in local jurisdictions' stormwater management manuals, and the Washington State Department of Ecology's (WDOE) stormwater management manual that is in use at the time of construction. If two sets of manuals are applicable, the more stringent controls will be used. Sound Transit has incorporated a number of CMs into the design, construction, and operation of the project, which are listed below.

A. In-Water Work - Water Quality Protection

- No in-water work will occur between March 15 and July 15 during juvenile chinook salmon out-migration and nearshore residence period. Other agencies may require a more restrictive work window for the protection of other species.

- Modified (e.g., low walls built on three sides) flat deck transport barges will be used to contain fill materials and prevent sediments from entering the water.

- Sediment barriers and other appropriate erosion control devices will be installed on the barge.

- If a clamshell-type dredge is used to transfer construction fill to shore, the dredge operator will fully close the clamshell to avoid releasing fill material into the water.

- Clean imported fill material will be used.

- Barge operations will be limited to periods of high tide, in daylight.

- Construction material will be stockpiled away from the shoreline/stream areas, on rail cars, or on upland/east side of the tracks.

- The number of barge trips to shore will be minimized.

- Anchors will not be set where eelgrass or kelp are present.

- Anchors will be removed vertically via boat instead of dragging them across the substrate.

- Floats and positively buoyant float line will be attached to anchors to avoid seabed and eelgrass disturbance.

- To the extent practicable, cement railroad ties may be used where track segments will be upgraded. However, strict design and operational criteria (i.e., meets tonnage, train density, and gross tonnage/mile criteria, and length of section to be upgraded) would need to be met before using concrete ties.

- Low ground pressure equipment will be used during construction in/near lagoon and beach areas to minimize construction impacts.

- Any replaced creosote-treated rail ties will be managed in accordance with applicable environmental laws and regulations with a preference for burning the ties for alternative fuel at an approved facility.

B. Upland Work - Erosion Control

- Provide erosion control through use of BMPs such as barrier berms, silt fences, and sediment ponds.

- Cover exposed soil with mulch, seed, plastic cover or bonded fiber mats to minimize the extent and duration of exposure to erosion by wind and rainfall.

- Develop and implement a Temporary Erosion and Sediment Control Plan (TESCP).

- Monitor erosion and sediment control measures.

C. Spill Control

- Develop and implement, if necessary, a Spill Prevention, Control, and Countermeasures (SPCC) Plan to comply with WDOE standards.

- Implement spill control measures at each construction site to keep uncontrolled release of fuels and other construction materials from entering receiving waters through stormwater runoff.

- Handle hazardous materials in a manner that minimizes the risk to aquatic and riparian habitats.

D. Stormwater Controls

- National Pollution Discharge Elimination System (NPDES) construction permit requirements will be adhered to.

- Section 401 Water Quality Certification conditions will be followed. All applicable state and local water quality standards will be complied with and the most stringent standards will be followed.

- The most stringent stormwater management measures in place at the time of construction will be used to providing appropriate stormwater treatment such as infiltration, on-site detention, and/or upgrading of existing infrastructure to provide the required treatment for stormwater runoff.

- Earthwork will be scheduled during the dry season when possible. Erosion control BMPs will be utilized.

- Loading and transport facilities will be custom designed to prevent discharge of spoils/oil/fuel into aquatic systems.

- Land disturbance will be kept to the minimum area necessary.

- Stormwater management plans will be coordinated with local jurisdictions and WDOE to

confirm that they are reviewed and are consistent with local and State requirements.

1.3.5 Construction Methods and Phasing

A. **Train Stations.** Sound Transit will carry out station improvements/construction in currently developed and/or urban upland areas. It will transport materials to construction sites by truck or rail and most of the activity will be accomplished using standard construction equipment such as backhoes, graders, etc. Staging areas (utilizing previously cleared or developed sites) will be used in advance of all construction work for stockpiling, loading, and hauling fill materials and construction equipment. Contractors will also use the property in which the facility is being constructed as a staging area. Other staging areas may be needed where the facility property is not large enough and will be identified and utilized as necessary.

Sound Transit's land clearing activities at station sites may include demolition and/or removal of pavement, minor amounts of vegetation, and other surface features. During the grading phase, the contractors will install culverts or other permanent drainage structures and below-grade rail infrastructure. Underground utility services may be relocated during the grading phase.

B. **Corridor Improvements (CIs) and At-Grade Crossings in Upland Areas.** Most of the CIs (CIs 2, 3, 6-13, 15, 18, 21, 22, and 24) and the nine At-Grade Crossings involve minor work in upland areas. Sound Transit will utilize upland construction methods similar to those described for station sites. Generally, materials will be delivered to the site by rail or truck, and work will be staged from the BNSF ROW.

C. **In-water Construction**

- **Everett - Lowell Junction (CIs 1 and 2).** Construction at the Lowell Junction site in Everett will require work in a ditch and at the culvert between the ditch and Bigelow Creek. Sound Transit will bring construction equipment to the site via the rail bed or uplands west of the area to avoid impacts to existing wetlands. Sound Transit will use track hoes, bulldozers, dump trucks, a wheel loader, a grader, and a compactor.

- **Mukilteo - Double Track (CI 16).** CI 16 relies on barge-based construction. Barge-based construction allows the most efficient construction method at the Mukilteo site, with the lowest potential environmental impact. In-water work equipment includes a large barge-mounted crane with up to two materials barges rafted to its western flank at a time, several skiffs (small utility boats) used for anchor/tow cable handling, one to two medium sized track hoe(s), a medium sized bulldozer, and a trenching machine. Sound Transit will use several thousand feet of anchor chain and cable, and floating cable so that the chain will not touch bottom in the nearshore, intertidal habitat areas, avoiding scour to the beach and eelgrass beds. Sound Transit will use fluke type anchors placed offshore, well outside the intertidal area and eelgrass beds; the land-side anchors will be tied directly into the shoreline. Barge operators will move toward the shoreline during

high tides by manipulating anchor cable with a winch. Construction during high tides will consist primarily of placing clean rock fill and large rock along the shoreline to the level of MHHW. Sound Transit will generally place material via conveyor belt or by crane using a dump bed from a mining truck, either method allowing precise placement of fill. Sound Transit will place a track-hoe on top of a newly created the fill pad (the fill offloading and staging area) to further control and move the fill, and may use a second track-hoe to place armor rock concurrently on the fill slope.

As the tide goes out, the operators will winch barges to an area outside the intertidal area. Just prior to leaving the intertidal area, a bulldozer may be placed on top of the fill pad to assist with construction. Sound Transit will place floats at regular intervals along the anchor lines to prevent them from contacting the bottom. Sound Transit will continue to place armor rock from the fill pad at this time, manipulating it to allow a tight fit.

Sound Transit will load and off-load all rock material to the construction barge while the barge is away from the shoreline. This will allow the transfer of fill material to occur outside of eelgrass beds, and in areas that allow at least 30 feet of water to be kept below the hull.

Once the fill pad is constructed, above the level of MHHW Sound Transit will place a concrete block retaining wall along the outer edge of the fill pad, and backfill the area with quarry spalls (angular rock) and dirt. Based on a total fill requirement of approximately 19,000 cubic yards, there will be approximately 15 barge trips to the site. If the weather is mostly dry, construction using barges is expected to take less than four months. Several culverts cross under the tracks in this segment. The culverts range from 18 to 72 inches in diameter. Most of these culverts provide general stormwater collection from the bluff; two culverts are fed by unnamed streams that flow into Puget Sound. Sound Transit will lengthen them by approximately 15 to 20 feet with the placement of the second track.

- **Edmonds/Woodway - Double Track (CI 20).** CI 20 construction will be similar to CI 16, except that barges will not be used to transport material to the site. Sound Transit will construct the new fill and wall using trucks to haul material from the north and south ends of the site. Area east of the track is sufficient to allow staging materials and constructing the new fill. Sound Transit will use existing sites near the proposed corridor improvement as upland staging areas to store construction materials. Sound Transit will add temporary dirt or gravel roads, commonly referred to as haul roads, to flat areas immediately adjacent to the existing tracks. It will use the haul roads to move materials from the upland staging areas to the construction area. Sound Transit will then dump, grade, and compact the fill. Where there are noticeable differences between the existing grade and the grade to be constructed, Sound Transit will dump and grade fill materials to create the rail bed as construction progresses linearly along the corridor improvement.

  Sound Transit will use the following equipment near the intertidal areas: track hoes, bulldozers, dump trucks, a wheel loader, a grader, and a compactor. In the upland areas Sound Transit will likely use wheel loaders, and possibly a crane, to load trucks.

In the northernmost portion, Sound Transit will likely construct fill using equipment and materials located on both sides of the existing track. Based on a total fill requirement of 18,000 cubic yards, there will be 1,200 to1,500 truck trips to the site. Trucks will most likely be dump trucks with pony trailers. While the majority of fill construction will occur in a four to six week period, the full construction period may take three months. Sound Transit expects dump trucks will follow the same route that the tankers from the Chevron terminal at Point Wells currently take. Richmond Beach Road is the main road to access the south part of the site, via the Chevron terminal. The north access road is Admiral Way, which is along the BNSF tracks.

Track-hoes may need to work in the lagoons on the east side of the tracks during low tides (when the lagoons are empty) to construct the 2- to-1 side slope/concrete block wall sections and to work on the culverts. Sound Transit or its contractors will fit the equipment with low ground pressure tracks to minimize ground disturbance in these mud flat areas.

Several culverts ranging from 18-inches to 72-inches in diameter cross under the tracks in this segment. At least four culverts connect the lagoons to Puget Sound, and one culvert is fed by Deer Creek, which travels through a culvert under the track before emptying into Puget Sound. Sound Transit will lengthen this culvert by 15 to 20 feet during construction of the double-track segment. All track work will occur within the existing BNSF ROW.

1.4 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. (50 CFR 402.02). The action area is for this project is the entire eastern shoreline of Puget Sound, from the riparian area above high tide (approximately 200 to 300 feet inland), offshore to minus 20 feet mean-lower-low-water (MLLW) (approximately 200 feet offshore), from West Point to the Snohomish River (approximately 35 linear miles), the work sites in Everett and Seattle, and the land adjacent to the work sites. In addition, the waterbodies, roadways, and rail lines that carry materials to work locations and other sites where fabrication of materials for the project occurs may be impacted by the proposed project.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

The purpose of consultation under the ESA is to ensure that any action authorized, funded, or carried out by a Federal agency is not likely to jeopardize the continued existence of threatened or endangered species, or result in the adverse modification of designated critical habitat. Formal consultation concludes with the issuance of a biological opinion under Section 7(b)(3) of the Act.

The standards for determining jeopardy are set forth in 50 CFR 402. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries determines if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of injury and mortality attributed to: (1) collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area.

2.1.1 Biological Requirements.

Biological requirements are those conditions necessary for the Puget Sound chinook salmon (*Oncorhynchus tshawytscha)* ESU to survive and recover to naturally reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stocks, enhance the species' capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment. Specific information related to biological requirements for Puget Sound chinook salmon can be found in Myers, *et al.* (1993).
Biological requirements are generally defined as properly functioning habitat relevant to each life history stage of chinook salmon. In addition, there must be enough of the properly functioning habitat to ensure the continued existence and recovery of the ESU. Presently, due to degraded conditions described in the following subsection, the biological requirements of chinook salmon are not being met under the environmental baseline. The specific Puget Sound chinook habitats that are likely to be affected by the project are nearshore and intertidal areas in marine waters that are necessary for juvenile chinook rearing and migration.

2.1.2 Environmental Baseline

The environmental baseline represents the current set of conditions to which the effects of the proposed action are then added. Environmental baseline is defined as "the past and present impacts of all Federal, State, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal Section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process" (50 CFR 402.02).

The locations and general habitat conditions in areas where chinook salmon could be affected are described by project element below. Overall, the condition of the nearshore marine habitat approximately three feet above MLLW is degraded from historic development of the railroad and placement of riprap. Railroad construction circa 1910 interrupted the natural coastal processes along the eastern shore of Puget Sound between Everett and Seattle. The natural transportation of upland material (organic and inorganic debris) via erosion onto the beach and into the intertidal zone was cut off by the placement of fill for the rail line in the upper intertidal zone. As a result, most of the shoreline between Everett and Seattle lacks low gradient beach areas in the upper intertidal zone (greater than three feet MLLW). The intertidal zone has also been starved of fined grained material. In addition, the rock seawall that supports and protects

the railroad fill, promotes greater erosion of the shoreline by deflecting wave energy, and reduces the amount of shallow water habitat that juvenile chinook salmon rely upon by creating a deeper water, vertical shoreline.

Much of the eastern shore of Puget Sound between Everett and Seattle is steep bluff composed of glacial till. Under natural conditions where the banks are not armored, material sloughs off via landslides bringing material ranging in size from boulders to clay sized particles, entire trees, and other vegetation to the beaches. The construction of the rail line disconnected these landslide materials from reaching the shore. Landslides still occur, but only large ones provide enough material to spill over the rail line onto the intertidal area. The railroad gathers slide material that accumulates on the tracks and transports it to upland disposal areas.

The intertidal/nearshore area provides several important ecological functions, which directly and indirectly support juvenile and adult salmonids (Healey, 1991). The nearshore habitat functions supporting juvenile salmon include refuge from predation, and food (prey) production as well as providing a migration corridor. Most concentrations of juvenile chinook salmon have been found in shallow nearshore habitats as they migrate and feed along the shore. Juvenile chinook are found within six to nine feet of the water surface (KCDNR, 2001). Juvenile salmon are vulnerable to predation from both birds and other fish and need habitat that provides refuge at all tidal stages. Behaviorally, juvenile ocean type chinook salmon (less than 70 to 85 millimeters) are shoreline oriented during daylight hours (Thom *et al.,* 1989; Hayman *et al.*, 1996). That is, they reside along the shore and depend on the shallow water for forage and shelter from predation. The type of substrate, gradient, presence or absence of woody debris, and overhanging vegetation can all contribute to functions that nearshore habitat provides for juvenile salmon. The existing rock seawall supporting the railroad consists of large angular boulders with large interstices and provides little if any habitat for juvenile chinook salmon.

Nearshore habitats in Puget Sound also provide spawning areas for forage fish including herring, sand lance, and surf smelt, which are important food sources for adult and sub-adult chinook salmon (KCDNR, 2001). Herring spawn in eelgrass (*Zostera marina*) beds, that grow in the lower intertidal and shallow subtidal zone (generally to15 feet below MLLW). Although eelgrass habitat is found extensively along the project corridor, herring spawning areas have not been documented there (KCDNR, 2001; WDFW Priority Habitats and Species Maps). Eelgrass provides other habitat functions for juvenile salmon such as a refuge and feeding. Sand lance and surf smelt spawn on sand and gravel beaches in the upper intertidal zone (plus 4.5 feet to the MHHW). There are four locations along the project corridor with documented spawning beaches including one in Edmonds on both sides of the ferry dock (Brackett's Landing Park), and three locations in or northeast of Mukilteo (KCDNR, 2001; WDFW Priority Habitats and Species Maps). Generally, the upper intertidal beaches (high tide beaches) that forage fish need for spawning are scarce along the project corridor.

Combining the existence of the railroad corridor in the upper intertidal with the removal of the upland source of material has resulted in serious degradation of the nearshore habitat for juvenile chinook salmon. Where the juveniles would be able to find forage and shelter from predation, they are now exposed to predation in the upper intertidal when the water depth becomes deep enough to allow large fish to come into proximity of juvenile chinook salmon. Also, without sufficient forage opportunities, the juveniles (less than 70 to 85 millimeters) may move into

deeper water to find food, again making them more vulnerable to predation. In addition, the extra expenditure of energy relative to the amount of food taken in, possibly results in slower growth rates which can lead to increased mortality (Beckman *et al.,* 1998). There is a direct relationship between size and survival of juvenile salmonids.

Shallow, productive, gently sloped intertidal is extremely important to juvenile chinook salmon as necessary habitat for maximum survival of the ESU. Degradation of this habitat has probably been an important contributing factor in the decline of the ESU. The gradual degradation of this habitat would have occurred over many years after the introduction of the rail line. The beaches below the railroad fill have eroded over time, exposing hard substrate that is less subject to erosion, resulting in the substrate changing from soft to hard. This change in substrate from soft to hard was likely associated with a change in fauna of the area. Improving the quality of the nearshore habitat would contribute to improved survival and recovery of Puget Sound chinook salmon.

Baseline conditions for the specific areas along the railroad where construction or restoration activities will occur are described in detail below.

- **Stations.** All six station sites occur on previously developed and/or urban upland sites consisting of pavement, asphalt or gravel. The baseline does not include vegetation or salmonid habitat features. Existing runoff from the sites is treated with oil/water separators or similar treatment devices in the existing drainage systems.

- **Everett - Lowell Junction to Sealine Junction - Third Main Line (CI 1).** Track side drainage ditches occur along the existing tracks near Lowell Junction. The ditches are hydrologically connected to Bigelow Creek via culverts. The creek at this location flows north in a ditch from near Lowell Junction for about 125 feet, passes under the tracks via a 24-inch concrete culvert, and discharges several hundred feet east of the CI 1 area. The ditch is about one to three feet deep, steep sided, low gradient, and has substrate composed of gravel, sand, and silt. The ditch is regularly maintained and provides poor habitat for salmonids. There is not any undercutting along the banks and streamside vegetation is lacking. Use by juvenile salmonids is unlikely.

  Two wetlands occur south of the I-5 overpass on the west edge of the Snohomish River floodplain. Wetland vegetation consists predominately of reed canarygrass (*Phalaris arundinaceae*) and Himalayan blackberry (*Rubus discolor*). Freshwater wetland fill associated with this CI totals 1.25 acres.

- **Everett - Lowell Junction to Pacific Avenue Junction - Second Mainline Track (CI 2).** The ditch at this location is part of a network of ditches that drain to the Snohomish River and has similar features to the ditch at CI 1. Use by fish is likely limited because regular ditch maintenance results in poor salmonid habitat. The ditch lacks undercut banks and streamside vegetation, providing little refuge opportunity. Limited vegetation is present and is composed primarily of blackberry *(Rubus* spp.).

- **Everett - Pacific Avenue Junction/Delta Yard Junction - Industrial Track (CI 3).** At this location, 0.05 acres of freshwater wetland will be filled. Wetland vegetation consists of

reed canarygrass. There is no existing access or refuge for salmonids.

- **Everett Station - Overnight Storage Tracks (CI 4).** This work will occur within the improved BNSF ROW. No habitat features for salmonids occur within the work area.

- **Everett - Sealine Junction to Rogers Siding - Second Mainline Track (CI 5).** Along the existing track several ditches connect to the Snohomish River via culverts that pass under fill east of the tracks. The ditches may be accessible by fish but actual fish use is not known. The conditions of the ditch are degraded and probably do not provide significant refuge habitat. The gradient of the ditches is low.

  There are eight freshwater wetlands varying in size from quite large to small along the Rogers Siding and Sealine tracks (CI 5). Three of the wetlands consist of weedy, invasive plant species. Four of the wetlands support emergent, shrub, and forested plant communities, and the largest wetland is partially dominated by emergent plants and by multi-layered forest and shrub habitats.

- **Everett - Bayside Line - Upgrade Existing Track (CI 11).** This work will occur within the improved BNSF ROW. No habitat features for salmonids occur within the work area.

- **Everett Junction - Convert Everett Set-out Track to Mainline Track (CI 12).** This work will occur within the improved BNSF ROW. No habitat features for salmonids occur within the work area.

- **Mukilteo - Double Track (CI 16).** The baseline conditions are presented for the marine area and the two unnamed streams.

  Mukilteo - Marine Area. The nearshore areas of Puget Sound including the CI area provide access for juvenile chinook and coho (*O. kisutch*) salmon, and other aquatic species. Depths range from above Ordinary High Water to 20 feet below MLLW. The gradient drops one to three feet within about 25 feet of the existing riprap toe. This gradient extends between 60 to 120 feet offshore and transitions to a broad, relatively flat bench between two and six feet below MLLW. The existing substrate is armored railroad bed with rock up to six feet in diameter down to coarse sand mixed with gravel and shell as one moves farther into the intertidal area. This area of Puget Sound called North Possession Sound is listed as an impaired waterbody on WDOE's 303(d) list (e.g., some metals, phenols, and dissolved oxygen). However, the CI area is located in an area with little industrial development and the water quality is considered to be generally good. For the same reason, the sediment quality is expected to be good. The existing riprap supports brown algae (rockweed and *Cystoseira* spp.), a filamentous green alga (*Enteromorpha* spp.), and red algae (including *Porphyra* spp., *Mastrocarpus* spp., and small patches of *Gigartina papillata*). The nearshore environment in the area of this CI supports eelgrass (about 10 acres) between two and 12 feet below MLLW), *Ulva* (6.5 acres), and kelp (2.6 acres). Based on the substrate characteristics of sand mixed with gravel and shell and the presence of macroalgae and eelgrass, this area is expected to support epibenthic production. Macrobenthos species observed or expected in the CI area are those typically associated with high intertidal, intertidal, and shallow subtidal

areas of Puget Sound. These include bivalve clams and mussels, snails, crabs, seastars, etc. The WDFW Priority Habitats and Species (PHS) maps indicate geoduck, Dungeness crab, and sea urchin occur in the subtidal area. These same maps do not indicate that the CI area is documented spawning habitat for surf smelt, Pacific sandlance, or Pacific herring. The area offshore from the CI is not a documented herring holding area.

Mukilteo - Unnamed Stream Near MP 28. The habitat characteristics of the unnamed stream near MP 28 are not suitable for chinook salmon. Coho could occur here, but have not been documented in this stream. The culvert appears to be a partial barrier to fish passage because it empties into Puget Sound about midway up the riprap-armored railroad grade, thereby restricting access to only those times near the high tide elevation. Upstream of the culvert the stream is low in gradient with steep banks. Upstream of this lower reach, the channel contains a series of short cascades separated by short, low-gradient riffles (totaling about 200 linear feet). Throughout this area the banks are steep and show signs of moderate-to-frequent failure. Upstream of the cascade and riffle reaches, the creek flows through a short, steep-sided, narrow chute that is downcutting through a clay layer. Upstream of this narrow chute, the creek flows through a relatively wide channel bottom (about 30 feet wide) that shows signs of large and frequent bank failure, which results in frequent channel shifting. The substrate consists of a relatively even mix of boulder, cobble, and gravel in the lower reach, boulder and cobble in the cascade reach, and sand, cobble, and gravel in the riffle reaches. The stream passes under the existing rail line via culverts and drains into Possession Sound. Vegetation is sparse, consisting of ferns, horsetail, grasses, salmonberry, and red alder. Streamside vegetation may support insect production. Epibenthos are not expected.

Mukilteo - Unnamed Stream Near MP 27. The habitat characteristics of the unnamed stream near MP 27 do not appear to be suitable for chinook salmon. Coho could occur here, but have not been documented in this stream. This stream crosses the tracks and empties into Puget Sound via two 36-inch concrete culverts located part way up the vertical riprap railway wall. The culverts are likely passable only under high tide conditions, and fish use is likely minimal. The stream occupies a deep, wooded ravine (known as the 80th Street Ravine) from the top of the plateau to the shoreline. The creek is piped for nearly all of this distance. There is a short, free-flowing section at the base of the ravine about 150 feet upstream of the tracks. The substrate is composed of boulders, cobble, and gravel. The riparian area is wooded and may support insect production. Epibenthos are not expected to occur.

- **Edmonds/Woodway - Double Track (CI 20).** The baseline conditions for the marine environment and three freshwater streams are presented below. This proposed improvement extends along the shoreline of Puget Sound from the Main Street at-grade crossing in downtown Edmonds to the Point Wells refinery in Woodway. This CI involves fill into the intertidal lagoons on the east side of the tracks and fill into the marine environment on the west side of the tracks.

  Edmonds/Woodway - Marine Area. The nearshore in this area is accessible to juvenile salmonids. Depths within the CI range from above OHW to 20 feet below MLLW. The railroad fill along most of this segment extends to between three and 11 feet above

MLLW, typically to about five feet above MLLW. The gradient drops about one foot within about 25 feet of the existing riprap toe. This gradient extends between 50 and 250 feet offshore and transitions to a broad, relatively flat seaward bench between two and four feet below MLLW. Immediately south of Edwards Point, the beach has eroded. West of the railroad bed (Puget Sound side) the beach substrates consist of coarse sand, scattered boulders, and mud. East of the rail track, the tidally influenced lagoons have mud substrates. South of Edwards Point, substrates are sand, gravel, cobble, riprap, and shell and cobble mudflats.

The steep slope east of the tracks is undeveloped and supports deciduous forest comprised mainly of bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*) with scattered Douglas fir (*Pseudotsuga menziesii*) and western red cedar (*Thuja plicata*). Existing marine vegetation on cobble or horizontal substrate below the riprap are rockweed (*Fucus* spp.), sea lettuce (*Ulva* spp.), and a shiny green droplike algae. Small red algae (*Pterosiphonia* spp., *Iridaea* spp., and small blades of *Gigartina* spp., are sparsely distributed in the lower intertidal beach area. The lagoons support scattered patches of saltgrass (*Distichlis* spp.), seacoast bulrush (*Scirpus maritimus*), pickleweed (*Salicornia virginica*), and several species of red and green algae. Based on the substrate characteristics of sand mixed with gravel and shell, the lagoon mudflats, and the presence of macroalgae and eelgrass, the area is expected to support epibenthic production.

Macrobenthos species observed or expected to occur are those typically associated with high intertidal, intertidal, and shallow subtidal areas of Puget Sound. These include bivalve clams and mussels, snails, crabs, seastars, etc. WDFW PHS maps indicate geoduck, Dungeness crab, and sea urchin occur in the subtidal area. The WDFW PHS maps do not indicate that the CI area is documented spawning habitat for surf smelt, Pacific sandlance, or Pacific herring. The area offshore from the CI is not a documented herring holding area.

Edmonds/Woodway - Shelleberger/Willow Creeks. Willow Creek is accessible to coho salmon and cutthroat trout. Cutthroat may access Shelleberger Creek. The outlet drainage ditch is highly disturbed and modified and has limited habitat for fish access or refuge. Both creeks are low gradient, as is the outlet ditch. Depth is about one to four feet deep. The substrate in Shelleberger/Willow Creek located at the Edmonds Marsh and Wildlife Sanctuary near the Edmonds marina consist of sand and gravel with small pools and riffles. The outlet ditch is mud and silt. The streams pass under the existing rail line via culverts and drain into Possession Sound where there is some freshwater mixing with marine waters. Riparian vegetation consists of a red alder stand before entering the marsh near the southeast corner. The outlet ditch has grass-lined banks with occasional blackberry and Scot's broom (*Cytisus scoparius*) shrubs. The stream side vegetation is expected to support insect production.

Edmonds/Woodway - Deer Creek. Deer Creek is low gradient through the culverts and in the delta area and transitions to high gradient slopes upstream. It is accessible to coho salmon. It crosses the BNSF double track alignment near MP 15.9 via dual 48-inch diameter concrete culverts. Upstream of the culvert is a small delta consisting of cobble and gravel with sand and silt accumulations along the margins and between the culverts.

Upstream of the delta reach, substrates in a 25-foot reach consist of cobbles and boulders with sand accumulations along the margins. A plugged culvert occurs within this reach. Upstream of the plugged culvert, substrates are cobble and gravel. Riparian vegetation is sparse, without overhead canopy. Streamside vegetation is expected to support some insect production.

Edmonds/Woodway - Unnamed Tributary Near MP 15.5. The unnamed tributary at MP 15.5 is low gradient through the culverts, downstream, and immediately upstream in the delta area and may be accessible to fish. Upstream of the delta, the creek is steep. The creek flows under the BNSF line through two 24-inch diameter culverts to the beach. The substrate consists of sand upstream of the culverts and sand and gravel downstream of the culverts. Substrates in an upstream delta are sand and silt. Upstream of the delta is a narrow, steep channel with cobble and gravel and sand accumulations along the margins. Riparian vegetation throughout the upper reach is moderately sparse and consists of reed canary grass, blackberry, salmonberry shrubs, and small alder trees. A sparse overhead canopy is provided by alder trees. Streamside vegetation is expected to support insect production.

- **Ballard - Double Track (CI 23).** This CI involves filling 0.22 acres of freshwater wetland. An unnamed drainage ditch at MP 7.3 is located along the east side of the BNSF railroad tracks in the area adjacent to Shilshole Bay Marina, and passes under the tracks near MP 7.3 through an 18-inch diameter corrugated pipe culvert. The ditch is primarily bounded by the railroad grade and a wooden retaining wall at the base of the steep embankment to the east. Low flows and stagnant water conditions during the summer months suggests little or no fish access to, or refuge in, this drainage ditch. The gradient is low. There is little vegetation in the ditch. There are two wetlands in the CI area. One is shrub dominated; the other has a vegetated channel associated with a perennial stream. The sparse ditch side vegetation is expected to support insect production.

- **Seattle - Interbay Rail Yard - Double Track (CI 24).** This work will occur within the improved BNSF ROW. No habitat features for salmonids occur within the work area.

- **Universal Crossovers (CI 13 Howarth Park, CI 15 Mukilteo, CI 18 Picnic Point, CI 21 Richmond Beach, and CI 22 Metum).** No habitat features for salmonids occur within the work areas, although the sites are adjacent to Puget Sound.

- **Centralized Traffic Control (CTC) (CI 6-10).** No habitat features occur within the work areas, although the sites are adjacent to Puget Sound.

- **At-Grade Crossings at Nine Intersections.** Minor work will occur at existing rail/street crossings where no habitat features occur.

- **Restoration Sites**

  Re-armoring of the Existing Rock Seawall Site. The existing seawall will be re-armored in areas were material has been sidecast to reinforce the wall and/or where boulders have fallen down on to the beach. The baseline condition are similar to those

described under Mukilteo - Double Track (CI 16) and Edmonds/Woodway - Double Track (CI 20).

Reduction in the Slope of the Rock Seawall Site. The baseline conditions are similar to those described under Mukilteo - Double Track (CI 16) and Edmonds/Woodway - Double Track (CI 20).

Estuary Habitat Restoration Areas. The Snohomish River estuary has undergone many changes since non-native peoples began to arrive and establish settlements in the mid-1850s. Thousands of acres of marsh have been drained, floodplain tributaries were ditched, and dikes, levees, revetments and bulkheads were constructed. The river and estuary have been dredged to removed snags and facilitate navigation and port development. Major transportation routes and industrial developments were established in the estuary and floodplain. The aggregate impact of these land-use activities has been substantial loss and widespread degradation of salmonid habitat. Habitat loss and degradation, in turn, has reduced salmonid production (Haas and Collins, 2001).

Freshwater Wetlands Restoration and Culvert Improvement Area. The freshwater wetlands restoration site is located in Everett near Lowell Junction. The ditch may be accessible to fish via Bigelow Creek. However, ditch maintenance activities may affect fish use and passage. The ditch depth is two to three feet, gradient is low, and the substrate is composed of sand, silt, and gravel. The ditch-side vegetation consists of reed canarygrass. The fill area is generally flat and consists of rail track, ballast, and select fill. The fill area is unvegetated.

Deer Creek Pool Enlargement and Riparian Planting Area. The baseline conditions for Deer Creek are described under Edmonds/Woodway - Double Track (CI 20).

2.1.3 Status of the Species

The proposed action occurs within the geographic area of the Puget Sound chinook salmon ESU. An ESU is a distinct population segment that is substantially isolated, reproductively, from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples, 1991). The geographic area of the Puget Sound chinook ESU encompasses the entire Puget Sound drainage basin west to the Elwah River basin and north to the Canadian Border. The Puget Sound chinook salmon ESU was listed as threatened on March 24, 1999 (64 FR 14307). Details regarding the general status of the species at the ESU level are incorporated from the notice of final rule, by reference.

The Puget Sound ESU is a complex of many individual populations of naturally spawning chinook salmon and 36 hatchery populations (64 FR 14308; March 24, 1999). The Puget Sound Technical Recovery Team (TRT), an independent scientific body convened by NOAA Fisheries to develop technical delisting criteria and guidance for salmon recovery planning in Puget Sound, has identified 21 geographically distinct populations representing the primary historical spawning areas of chinook in Puget Sound (NMFS 2001). Overall abundance of chinook salmon in this ESU has declined substantially from historical levels, and many populations are small enough that genetic and demographic risks are likely to be relatively high. Short- and long-term

trends in are predominantly downward, and several populations exhibit short-term declines. Factors contributing to the downward trends are widespread blockages of streams, degraded freshwater and marine habitat, upper river tributaries widely affected by poor forest practices, and lower tributaries and mainstem rivers affected by urbanization and agriculture. Hatchery production and release of chinook salmon is widespread and more than half of the recent total escapement returned to hatcheries. All Spring and Summer run populations throughout this ESU are depressed and are of special concern to NOAA Fisheries (Myers *et al.* 1998).

According to peak recorded harvest landings in Puget Sound in 1908, the historic run size of the ESU was estimated to be about 670,000 (Bledsoe *et al.* 1989). Recent mean escapements totaling 71,000 correspond to a run entering Puget Sound of 160,000 fish based on run reconstruction of escapement and commercial landings within Puget Sound. While mean escapement numbers still range in the tens of thousands, 11 of the 29 populations within the ESU were determined to be at "critical" risk with fewer than 1,000 fish. Widespread declines and extirpations of Spring and Summer run chinook populations represent a significant reduction in the life history diversity of this ESU (Myers *et al.* 1998).

Artificial propagation programs have had considerable influence on this ESU. Nearly two billion juvenile chinook salmon have been release into Puget Sound Rivers since the 1950's (64 F.R. 14307). The preponderance of hatchery production may mask trends in natural populations and make it difficult to determine whether local naturally spawning fish are of hatchery origin. There has also been widespread use of a small number of hatchery stocks (introduced into many river systems) which results in a greater risk of fitness loss and reduction in diversity among populations.

Generally, chinook salmon adults spawn in freshwater rivers and large streams at elevations above the flood plain. The eggs are deposited in gravel that has well oxygenated water percolating through it (Healey, 1991). The eggs over-winter and hatch in the gravel to become juveniles with a yolk-sac (called a yolk-sac fry). At about the time the yolk sac is absorbed the juveniles emerge from the gravel, usually in late winter, and begin to forage on their own. The juveniles forage and move downstream into estuaries where they continue to forage before moving into the North Pacific Ocean where they reside for one to five or more years (Healey, 1991). There are two typical life history strategies known as stream type and ocean type. The following paragraphs give greater detail on these life history strategies (Healey, 1991; Myers *et al.,*1998).

Stream type individuals emerge from the gravel in their first year of life, forage and move into the lower reaches of their natal river systems by late summer where they reside until the following spring. The following spring these individuals move into the estuaries and are sufficiently large (generally greater than 70 to 85 millimeters) that they can move freely over deep water where they continue to forage and grow. Near the end of the their second summer they move into the North Pacific Ocean where they reside for one or more years prior to returning to spawn in their natal streams.

Ocean type individuals emerge from the gravel, forage, move downstream into estuaries with weeks to a few months, depending on the distance from the spawning grounds to the river estuary. These fish are small, usually less than 40 millimeters, and during the daylight hours can

be found almost exclusively in the nearshore areas, showing a strong preference for the shoreline. When they grow to a sufficiently large size (greater than 70 to 85 millimeters) they appear to lose the shoreline preference and will freely move offshore to forage (Thom *et al.,* 1989; Hayman *et al.*, 1996). This is not to say they will not forage in shallow areas, simply that they are not dependent on shallow water as a refuge from predation by large fish. Near the end of the summer they move into the North Pacific Ocean where they reside for one or more years prior to returning to spawn in their natal streams. A small number of individuals, known as holdovers, may reside in freshwater for one additional year beyond their usual pattern. This results in larger individuals when they enter the estuaries and they behave like stream type fish (Healey, 1991).

The Straits of Juan de Fuca and Northern Puget Sound are migratory corridors for returning adults (these same bodies of water also provide habitat for outmigrating juveniles). Timing of adult returns is dependent on the life history type. Stream type individuals are commonly called Spring chinook since adults with this life history migrate into nearshore waters and return to natal streams in spring to early summer. They usually spawn greater distances from salt water than the ocean type stocks. The ocean type life history is commonly called the Fall chinook since most of these individuals move to their natal streams in late summer and fall. These individuals usually spawn lower in river systems and closer to salt water than the stream type stocks. Most chinook salmon in Puget Sound are the ocean type because the river systems are fairly short compared to other larger river systems such as the Frazier River and the Columbia River which support numerous populations of stream type chinook salmon.

Sampling for juvenile chinook in salt water has been conducted near the mouths of the major rivers on the east side of Puget Sound (Tyler and Bevan, 1964; Weitkamp and Schadt, 1981). Ocean-type chinook were captured near these river mouths from March through June in high numbers, with much smaller catches occurring through the summer. Adults could be present in deeper offshore waters all year. The highest abundance of adults is in summer and early fall as they return from the ocean to natal streams and rivers to spawn (Healey, 1991). Chinook salmon typically spawn in the mainstems and larger tributaries of Puget Sound. Spawning preferences include clean gravel riffles with moderate water velocity and mainstem and lower reaches of tributaries. The adults enter rivers between August and September, and spawn in late September through October.

2.1.4 Status of the Species in the Action Area

Three Puget Sound chinook stocks occur within the action area; the Green/Duwamish River stock, the Cedar River/Lake Washington stock, and the Snohomish River stock. Adults from these stocks may pass through the action area on their way to spawning grounds, but are not shoreline dependent. The main concern of this consultation is shoreline dependent juvenile fish that migrate and rear in the intertidal area of Puget Sound adjacent to the BNSF rail corridor.

A. **Green/Duwamish River.** The TRT identified one population of chinook within the Green/Duwamish basin. This stock is composed of naturally producing wild fish and hatchery stock. Adult chinook typically enter the Green/Duwamish basin from June through October, with spawning occurring from mid-September to mid-November. Spawning occurs within the mainstem approximately from the

City of Tacoma diversion dam to the City of Auburn. The state hatchery located on Soos Creek produces large numbers of juvenile chinook. Most of the chinook in Green/Duwamish are considered ocean-type, with juvenile out-migration to Puget Sound occurring from April to mid July (Williams *et al.,* 1975). NOAA Fisheries classified the Green River stock as healthy based on high levels of escapement (Myers *et al.* 1998).

B. **Cedar River/Lake Washington.** The Washington State Salmon and Steelhead Stock Inventory (SASSI) divides the Lake Washington Basin summer/fall chinook into the Issaquah Creek, North Lake Washington tributaries, and Cedar River stocks. The Issaquah Creek chinook, a non-native hatchery origin stock, were classified as healthy, while the wild naturally produced North Lake Washington tributary and Cedar River stocks were classified as status "unknown."

The SASSI for North Lake Washington tributaries from 1984 to 1999 indicates a downward trend through the early 1990s that shifts upward in 1998. Actual escapements into the Bear/Cottage Lake Creek tributary averaged approximately 300 adults for the years 1983-1987 and less than 100 from 1992-1997. Escapement estimates in 1998 indicated an increase to approximately 260 adults. In the Cedar River, escapement and harvest surveys were initiated in 1973, and escapement estimates have ranged from 156 in 1993 to 1,540 in 1987. Run size tended to be lower during recent years (1988-1999) compared to earlier years (1968-1987), indicating a downward trend.

In the Lake Washington basin, Fall run chinook begin migrating through Lake Washington to reach spawning grounds in June, with the peak migration occurring in August. Spawning occurs from mid-September to mid-December (Myers *et al.,* 1998). The ocean-type chinook in the Lake Washington basin typically begin their downstream migration as sub-yearlings (Myers *et al.,* 1998). For some years, most chinook juveniles in the Cedar River emigrate as fry, reaching Lake Washington in early January through March. A second wave of juvenile fingerlings enter the lake in May and June. In addition to the naturally spawned juveniles, the Issaquah Creek hatchery has an annual production goal of releasing two million age zero plus chinook each May. The University of Washington hatchery has an annual production goal of releasing 180,000 chinook smolts each May. The majority of chinook smolts leave Lake Washington and enter Puget Sound in May and June.

C. **Snohomish River.** The Snohomish River is described as a major river supporting chinook salmon in the Puget Sound (Myers *et al.*, 1998). The Snohomish River stock is made up of two distinct populations; the Snoqualmie and the Skykomish. All Snohomish basin chinook are either Summer or Fall runs. Summer chinook enter freshwater from May through July and into August, with spawning primarily occurring in September. Fall chinook spawn from late September through October. Fall run chinook spawning in the Snoqualmie River continue through November (WDF *et al.,* 1993).

The Skykomish River population spawns in the upper mainstem of the Snohomish River

and in the Skykomish River and tributaries to these rivers. Skykomish chinook also spawn in the Sultan River, Wallace River, Woods Creek, and Pilchuck River. Wallace River chinook are sustained by both wild spawners and hatchery production. Snoqualmie River chinook spawn in the Snoqualmie River and its tributaries.

A 1970 study by the Pacific Northwest River Basins Commission stated that from 1956-1965 chinook returns (catch plus escapement) ranged from 5,520 to 72,480. From that period, total returns declined steadily, and the introduction of hatchery-produced chinook failed to reverse the downward trend in wild stocks. From 1971 to 1980, the annual average escapement of wild chinook fell to 10,565, from 1981 to 1990, escapement fell to 8,619, and from 1991 to 2000, it fell to 4,661. Because of three continuous decades of decline to present low levels, a SASSI review in 1993 (WDF, 1993), followed by a NOAA Fisheries Status Review (Myers *et al.,* 1998), indicated that Snohomish Summer and Fall stocks are depressed.

Although most Snohomish basin summer/fall chinook smolts emigrate as sub-yearling ocean-type, a relatively large proportion of smolts (33% in 1993 and 1994 samples) are stream-type (Myers *et al.,* 1998). Of returning Fall chinook, 25 to 30 percent showed a stream-type life history (Snohomish Basin Salmonid Recovery Technical Committee, 1999). No other Summer or Fall chinook stocks in Puget Sound produce this high a proportion of yearling smolts (Puget Sound Indian Tribes and WDFW, 2001). Juvenile outmigration to Puget Sound occurs from mid-April to July. Stream-type juveniles rear in fresh water throughout the year.

2.1.5 Relevance of Baseline to Status of the Species

Presently, the biological requirements of the ESU are not being met under the environmental baseline. The factors for population decline that contribute to the need for listing the ESU continue to be present in the action area. To improve the status of the listed species, significant improvements in the habitat conditions are needed. Improving floodplain connectivity and habitat, restoring estuary habitat and distributary channels in the estuary, removing shoreline armor, eliminating barriers to fish passage, and riparian restoration are all items that could enhance salmonid production in the basin.

2.2 Effects of the Proposed Action

2.2.1 Direct and Indirect Effects

The ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." Indirect effects are those that are caused by the proposed action, are later in time, but are still reasonably certain to occur (50 CFR 402.02). Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated because they will be consulted on separately at a future date.

Most of the proposed CIs (CIs 2, 3, 6-13, 15, 18, 21, 22, and 24), the nine At-Grade Road Crossings, and the Station construction and improvements involve minor work in upland areas. Temporary water quality degradation from grading is the most common effect that could potentially occur. However, because Sound Transit will use conservation measures, including BMP during construction to avoid and minimize these effects, no adverse effects to chinook salmon or their habitat are expected to occur as a result of these actions.

Corridor Improvements 1, 4, 5, and 23 involve the filling of 2.14 acres of freshwater wetlands. In addition, multiple culverts in freshwater streams or ditches will be lengthened. None of the streams or ditches contain chinook salmon, being too small to provide chinook habitat, but some may provide coho salmon habitat. Lengthening these culverts will not alter salmonid passage conditions. Because the in-water timing restrictions will ensure that juvenile chinook (and coho) are not present in the work area, and Sound Transit will use conservation measures to avoid and minimize sedimentation to downstream waters, the fill activities and culvert extensions are not expected to result in any adverse effects to chinook salmon or their habitat. The freshwater wetland and ditch restoration at Lowell Junction will create off-channel rearing habitat offsetting the habitat loss associated with the wetland fill and culvert extensions.

Similarly, conservation measures during placement of the fill in Puget Sound for corridor improvements CI 16 and CI 20 are expected to avoid direct harm or mortality of individual chinook salmon. In-water construction will only occur during periods when juvenile chinook salmon are absent from the work area. Water quality degradation that could occur during construction will be minimized or eliminated through the use of BMPs.

The permanent loss of 1.0 acre of the nearshore foraging and rearing habitat from filling the intertidal beach and corollary loss of prey resources from activities CI 16 and CI 20 is likely to adversely affect chinook salmon. The fill area represents a small percentage of the total available intertidal habitat present along the affected shorelines, conservatively estimated to be 16 and 38 acres, for Mukilteo and Woodway, respectively. The functional losses associated with the conversion of aquatic habitat include: temporal loss of primary production, substrate loss for primary and secondary production, and nearshore forage habitat loss. Loss of forage habitat may result in higher mortality among juveniles, or smaller size of juveniles, making them more vulnerable to predation. Loss of shallow water also prevents juveniles from sheltering from predators. Eelgrass will be protected from construction impacts by careful placement of anchors and piles, and by using synthetic, positively buoyant rope instead of anchor chains.

To offset the effects of the loss of 1.0 acre of nearshore habitat from CI 16 and CI20 discussed above, Sound Transit will undertake the following activities to provide functional gains in juvenile chinook rearing and forage habitat in the nearshore area, including the estuary of the Snohomish River:

- Retrofit riprap walls to 2- to-1 slopes using ecology block walls to reduce beach erosion from wave action and to restore a more natural gradient;

- Restore estuarine habitat in the Snohomish River estuary and enhancement of nearshore areas (one of three nearshore enhancement activities will be implemented together with the estuary restoration) in accordance with the Mitigation Plan; and

- Acquire the necessary legal easement or deed restrictions, to last for the life of the rail line, for the protection of the restoration sites.

The estuary restoration in the Snohomish River is proposed to offset the habitat loss of 1.0 acre of natural beach substrate in the Puget Sound from CI16 and CI 20. Although this is an "out-of-kind" habitat replacement, the beneficial effects to the species from the estuary restoration will outweigh the detrimental effects of the intertidal habitat loss. The Snohomish River estuary is critical for smolt production and has been identified as a habitat "bottleneck" to chinook salmon production in the Snohomish Basin because of extensive estuary habitat loss from diking, riparian clearing, and wood removal (Snohomish Basin Salmon Recovery Forum, 2001). The estuary restoration in the Snohomish River will increase rearing opportunities for out migrant, young-of-the-year, chinook salmon. This in-turn will reduce the need (at least for those individuals that utilize the increased river mouth habitat) for shallow nearshore marine habitat once they enter Puget Sound proper. Juvenile chinook salmon lose their shoreline orientation when they reach about 65 millimeters in length, therefore juveniles that are bigger when they leave brackish water areas and enter into the marine environment of Puget Sound are less dependent on nearshore intertidal habitat. Overall, increased survival of the Snohomish River chinook salmon within this action area is expected.

The three nearshore enhancement projects that Sound Transit has identified (of which one will be implemented) are also designed to offset the effects of the intertidal fill, and to provide functional gains in nearshore, intertidal habitat. The nearshore enhancement projects are discussed below in the order in which they will be pursued by Sound Transit:

1) Install one or two trestles to replace existing culverts. The trestles would provide greater passage of sediment and organic matter from upstream areas to the intertidal beach and allow a more natural rate of sediment recruitment to occur to the intertidal areas. Greater sediment recruitment would enhance nearshore beach habitat that is used for juvenile chinook rearing and migration;

2) Purchase and retire log raft leases on mudflats at the mouth of the Snohomish River. Removing log rafts from the mudflats would restore intertidal feeding and rearing habitat for juvenile chinook salmon that is currently unavailable because the log rafts ground at low tide; or

3) Remove abandoned creosote treated pilings along the BNSF rail corridor between Everett and Seattle. This option would be pursued only if the first two options are infeasible. Removing the abandoned creosote pilings would eliminate this chronic source of toxic material from the nearshore area. The removal of the toxins would benefit not only chinook salmon, but their prey base as well.

The Everett-to-Seattle Commuter Rail project may also have an indirect beneficial effect by minimizing the growth rate of highways in the Tri-County area. By providing the commuter rail as an alternative for drivers, the rate of increase in the amount of impervious surface and the corollary destruction of freshwater habitat that resultss from highway expansion may be reduced.

2.2.2 Interdependent/Interrelated Actions

Interdependent actions are actions that have no independent utility apart from the primary action. Interrelated actions are those actions that are part of the primary action and depend on the primary action for their justification (50 CFR 404.02).

There are no interdependent actions associated with this project. The project will not result in additional actions that lack independent utility apart from the project. The project is part of the regional transportation plan approved by Puget Sound voters in 1996. Two other segments of the commuter rail line have been consulted on separately through the informal Endangered Species Act (ESA) Section 7 consultation process. Interrelated actions include the station improvements, universal crossovers, track upgrades, and mitigation activities, all of which have been included in the proposed action and analysis of effects.

2.2.3 Cumulative Effects

Cumulative effects are defined as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Providing improved transit access may contribute to more intense and higher density development in the station areas. All of the stations locations are already highly urbanized areas and any new developments will likely affect already developed lands. Increased densities on already developed lands will likely have a basin-wide net beneficial effect on water quality, hydrology, and fish resources, by clustering higher density housing in urban areas, rather than automobile-dependent urban sprawl.

2.2.4 Conclusion

The proposed action is not likely to jeopardize the continued existence of the Puget Sound chinook salmon ESU. The determination of no jeopardy was based on the following actions: 1) timing restrictions related to in-water construction are expected to avoid and/or minimize potential impacts to chinook salmon; 2) decreasing the slope (steepness) of the riprap wall along the Puget Sound side of the intertidal fill for 10,500 feet; 3) filling the interstices of the riprap wall, with the smallest rock consistent with stability, on the Puget Sound side of the intertidal fill for 10,500 feet; 4) restoring estuary habitat near the mouth of the Snohomish River; 5) expanding the pool habitat in Deer Creek on the east side of the rail line and planting riparian vegetation along the lower reach of Deer Creek; 6) restoring the wetland and ditch adjacent to Lowell Junction in Everett to provide off channel access and rearing habitat; 7) installing and maintaining stormwater facilities to minimize the effects of increased impervious surface; 8) conducting a nearshore habitat enhancement project (one of three options identified in the Mitigation Plan; and 9) indirectly reducing the growth rate of highways in the Tri-County area by providing the commuter rail as an alternative for drivers, thereby potentially reducing the rate of construction of impervious surface and destruction of freshwater habitat that may occur from highway expansion. Actions 2, 3, 5, and 8 will improve habitat conditions for the Cedar River/Lake Washington and Green/Duwamish River stocks, while actions 4, 5, 6, and 8 will improve habitat conditions for the Snohomish River stock. Each of these stocks are components

of the Puget Sound ESU. Overall, the proposed activities are not expected to appreciably reduce the likelihood of survival and recovery of the Puget Sound chinook salmon ESU.

2.2.5 Reinitiation of Consultation

Consultation must be reinitiated if the amount or extent of take specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16). If habitat enhancement measures described as part of the project and listed in the conclusion above as items 2 through 6, and/or the mitigation proposed and identified in the conclusion as item 8 are not completed, the amount of take resulting from habitat degradation will exceed that anticipated in this consultation, and the FTA must reinitiate consultation.

2.3 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to Section 4 (d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined as significant habitat modification or degradation that results in death or injury to listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 CFR 222.102). Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant/grantee carrying out an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to, and not intended as part of the agency action is not considered prohibited taking, provided that such takings is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.3.1 Amount or Extent of Anticipated Take

Incidental take in the form of harm from habitat loss in the nearshore intertidal area from this proposed action is reasonably certain to occur. The exact numerical amount of expected take of fish is difficult to determine, and therefore has not been quantified. Instead, as a surrogate measure, the extent of effects on habitat in the action area have been analyzed. Having factored both the take-reducing effects, habitat improvements of the action, and the take-causing effects of habitat loss, the extent of take anticipated and authorized in this statement is the take that would result from one year's reduction of available habitat to juvenile outmigrating chinook.

2.3.2 Reasonable and Prudent Measure

The NOAA Fisheries believes that the following reasonable and prudent measure is necessary

and appropriate to minimize incidental take of Puget Sound chinook salmon:

The FTA and/or its grantee, Sound Transit, shall take specific actions to minimize the effect of take associated with filling of intertidal substrate in Puget Sound.

2.3.3 Terms and Conditions

To comply with ESA Section 7 and be exempt from the prohibitions of ESA Section 9, the FTA must comply with the terms and conditions that implement the reasonable and prudent measure. These terms and conditions are non-discretionary.

To comply with the Reasonable and Prudent Measure above, the FTA and/or its grantee, Sound Transit, shall:

- Acquire by April 1, 2006, the necessary legal easements or deed restrictions to protect the restoration sites at Lowell Junction and in the Snohomish estuary from future development;

- Establish by April 1, 2005, a final monitoring and adaptive management plan to remain in effect until it is determined that the restoration sites have achieved performance standards. At a minimum, the sites will be monitored for five years, with an additional five years if a site does not meet the performance levels as specified in the conceptual Mitigation Plan dated January 9, 2003 (Appendix A of the BA); and

- Submit by April 1, 2005, a final detailed Mitigation Plan for the Lowell Junction restoration site, the estuary restoration in the Snohomish River, and the nearshore enhancement component to NOAA Fisheries for final approval prior to installation. The final detailed Mitigation Plan shall include information on which of the three nearshore enhancement options (install trestles, remove/retire log rafts leases on mudflats, or remove abandoned creosote pilings) will be implemented and why the particular option was selected. NOAA Fisheries will review and either approve or suggest revisions to the final mitigation plan within 30 days of receipt of the plan.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));
- NOAA Fisheries must provide conservation recommendations for any Federal or state activity that may adversely affect EFH (§305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall must explain its reasons for not following the recommendations (§305(b)(4)(B)).

Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Essential Fish Habitat consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km)(PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years)(PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon

(PFMC 1999). Casillas et al. (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the FTA.

Table 1. Species of fishes with designated EFH occurring in Puget Sound.

Groundfish Species	redstripe rockfish *S. proriger*	Dover sole *Microstomus pacificus*
spiny dogfish *Squalus acanthias*	rosethorn rockfish *S. helvomaculatus*	English sole *Parophrys vetulus*
big skate *Raja binoculata*	rosy rockfish *S. rosaceus*	flathead sole *Hippoglossoides elassodon*
California skate *Raja inornata*	rougheye rockfish *S. aleutianus*	petrale sole *Eopsetta jordani*
longnose skate *Raja rhina*	sharpchin rockfish *S. zacentrus*	rex sole *Glyptocephalus zachirus*
ratfish *Hydrolagus colliei*	splitnose rockfish *S. diploproa*	rock sole *Lepidopsetta bilineata*
Pacific cod *Gadus macrocephalus*	striptail rockfish *S. saxicola*	sand sole *Psettichthys melanostictus*
Pacific whiting (hake) *Merluccius productus*	tiger rockfish *S. nigrocinctus*	starry flounder *Platichthys stellatus*
black rockfish *Sebastes melanops*	vermilion rockfish *S. miniatus*	arrowtooth flounder *Atheresthes stomias*
bocaccio *S. paucispinis*	yelloweye rockfish *S. ruberrimus*	
brown rockfish *S. auriculatus*	yellowtail rockfish *S. flavidus*	**Coastal Pelagic Species**
canary rockfish *S. pinniger*	shortspine thornyhead *Sebastolobus alascanus*	anchovy *Engraulis mordax*
China rockfish *S. nebulosus*	cabezon *Scorpaenichthys marmoratus*	Pacific sardine *Sardinops sagax*
copper rockfish *S. caurinus*	lingcod *Ophiodon elongatus*	Pacific mackerel *Scomber japonicus*
darkblotch rockfish *S. crameri*	kelp greenling *Hexagrammos decagrammus*	market squid *Loligo opalescens*
greenstriped rockfish *S. elongatus*	sablefish *Anoplopoma fimbria*	**Pacific Salmon Species**
Pacific ocean perch *S. alutus*	Pacific sanddab *Citharichthys sordidus*	chinook salmon *Oncorhychus tshawytscha*
quillback rockfish *S. maliger*	butter sole *Isopsetta isolepis*	coho salmon *O. kisutch*
redbanded rockfish *S. babcocki*	curlfin sole *Pleuronichthys decurrens*	Puget Sound pink salmon *O. gorbuscha*

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.3 and 1.4 of this document, pages five through 99 of the BA, and pages one through 29 of the Mitigation Plan. The action area includes habitats that have been designated as EFH for various life-history stages of 46 species of groundfish, four species of coastal pelagics, and three species of Pacific salmon.

3.4 Effects of Proposed Actions

As described in detail in Section 2.2.1 of this document, the proposed action may result in detrimental long-term adverse effects to the habitat of chinook through the permanent loss of 1.0 acre of nearshore intertidal habitat. Since the habitat is used in a similar manner by the other species with designated EFH, these adverse effects apply to all of the species in Table 1. The functional losses associated with the conversion of aquatic habitat include: temporal loss of primary production, substrate loss for primary and secondary production, and loss of nearshore forage habitat.

3.5 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect EFH of 46 species of groundfish, four species of coastal pelagics, and three species of Pacific salmon.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to §305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. To minimize the habitat loss described above, NOAA Fisheries recommends implementing the Terms and Conditions found in Section 2.3.3 of the Opinion.

3.7 Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of those recommendations (MSA §305(b)(4)(A)) and 50 CFR 600.920(j)). This response must include a description of measures proposed to avoid, mitigate, or offset the adverse effects of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations, the FTA will need to reinitiate consultation in accordance with the implementing regulations for EFH at 50 CFR 600.920(l).

4.0 REFERENCES

Beckman, R., D. Larsen, B.Lee-Pawlak and W. Dickoff. 1998. Relation of fish size and growth rate to migration of Spring chinook salmon smolts. NAJFM, 18:537 - 546.

Bledsoe, L. J., Somerton, D.A., and C.M. Lynde. 1989. The Puget Sound runs of salmon: An examination of the changes in the run size. Department of Fisheries and Oceans, Ottawa, Ont. (Canada). Communications Dir. Proceedings of The National Workshop on Effects of Habitat Alteration on Salmonid Stocks., 1989, pp. 50-61, Can. Spec. Publ. Fish. Aquat. Sci., no. 105.

Casillas, E., L. Crockett, Y. de Reyner, J. Glock, M. Helvey, B. Meyer, C. Schmitt, M. Yoklavich. 1998. Essential Fish Habitat West Coast Groundfish Appendix. National Marine Fisheries Service, Seattle, Washington.

Haas, A., and C. Collins. 2001. A Historic Analysis of Habitat Alterations in the Snohomish River Valley, Washington, Since the mid-19th Century: Implications for Chinook and Coho Salmon. Prepared in coordination with Tulalip Tribes/Snohomish County Department of Public Works, Surface Water Management (A. Haas) and Consulting Geomorphologist (B. Collins). 74pp.

Hayman, R.A., E.M. Beamer, and R.E. McClure. 1996. FY 1995 Skagit River chinook restoration research. Report by Skagit System Cooperative, LaConner, Washington. 54 p. + appendices.

Healey, M.C. 1991. The life history of chinook salmon (*Oncorhynchus tshawytscha*). In C. Groot and L. Margolis (eds.), Life history of Pacific salmon, p. 311-393. Univ. B.C. Press, Vancouver, B.C.

KCDNR (King County Department of Natural Resources), 2001. Reconnaissance Assessment of the State of the Nearshore Ecosystem. King County Department of Natural Resources, water and Land Division. Seattle, WA.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memo. NMFS-NWFSC-35, 443 p.

National Marine Fisheries Service (NMFS). 2001. Independent populations of chinook salmon in Puget Sound. Puget Sound Technical Recovery Team Public Review Draft. 52pp.

PFMC. 1999. Appendix A. Identification and Description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. PFMC, Portland, Oregon. 146 pp.

PFMC. 1998a. The Pacific Coast Groundfish Fishery Management Plan. Pacific Fisheries Management Council, Portland, Oregon.

PFMC. 1998b. Coastal Pelagics Fishery Management Plan. Pacific Fisheries Management Council, Portland, Oregon.

Puget Sound Indian Tribes and WDFW. 2001. Puget Sound Comprehensive Chinook Management Plan: Harvest Management Component.

Snohomish Basin Salmonid Recovery Technical Committee. 1999. Initial Snohomish river Basin Chinook Salmon Conservation/Recovery Technical Work Plan.

Snohomish Basin Salmon Recovery Forum. 2001. Draft Snohomish River Basin Chinook Salmon Near Term Action Agenda, August 2001. Snohomish County Surface Water Management Division. Everett, WA.

Thom, R.T., C.A. Simenstad, J.R. Cordell, and E.A. Salo. 1989. Fish and their epibenthic prey in a marina and adjacent mudflats an eelgrass meadow in a small estuarine bay. Unpublished report to Port of Bellingham by Fisheries Research Institute, University of Washington, Seattle, Washington. 27 p.

Tyler, R.W. and D.E. Bevan. 1964. Migration of juvenile salmon in Bellingham Bay, Washington. Research in Fisheries, 1963. Univ. Washington Coll. Fish. Ontrib. No. 166. p 44-45.

Waples, R.S. 1991. Pacific salmon, *Oncorhynchus* spp., and the definition of "species" under the Endangered Species Act. Marine Fisheries Review 53:11-22.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI). Wash. Dep. Fish Wildl., Olympia, 212 p. + 5 regional volumes. (Available from Washington Department of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501-1091.)

Weitkamp, D.E., and T.H. Schadt. 1981. Fish, Technical Report. In Volume III Fish and Wetlands, Commencement Bay Studies. Report from Dames and Moore to Corps of Engineers, Seattle District, Seattle, Washington. 75p + Appendices.

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. A Catalog of Washington Streams and Salmon Utilization. Volume 1. P uget Sound Region. Washington Department of Fisheries, Olympia.